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Yes, you *can* take it with you — your collection of documents, spreadsheets, and data, that is.

Switching between your II and your Mac gives you the best of both Apple worlds.

With the introduction of the Macintosh Classic and the LC, more and more Apple II users are thinking about adding Macs to their classrooms or dens. While you may not be able to run all your II applications on your Mac and you can't run any of your Mac applications on your II, the good news is that you can take a lot of your data with you. Until recently, exchanging data between Macintosh and Apple II computers has been a relatively neglected subject, except by a circle of programmers, hobbyists, and network administrators. It's clear that Apple IIs and Macs will coexist for many years to come and that if you have access to both systems, you'll be facing the challenge of Apple II/Mac file transfer and conversion.

Exchanging data between the two systems is surprisingly simple and is getting easier all the time, but it often seems to be a well-kept secret as far as Apple is concerned. Apple's official solution for using Macs and Apple IIs in the same

By Mike Markowitz



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environment is a rather expensive network, which makes the IIc or GS into a terminal attached to a Macintosh file server. This arrangement doesn't let you run Apple II software on the Mac or vice versa; the Mac file server's hard drive just stores the Apple II programs and files. But it does let Mac users access Apple II data and vice versa. (See "Connecting in the '90s," December 1990, p. 66, for more information.)

An AppleTalk network running AppleShare is a great solution for some people, but there are much simpler solutions with less-expensive requirements. In some cases you'll need a modem; in others, you'll need only a 3.5-inch floppy-disk drive. Let's take a look at some of the options for exchanging various kinds of files between Apple's two computer families.

ACCESSING YOUR DATA

What do the terms *file transfer* and *file conversion* mean? There are at least three different levels of connectivity between computers that use different operating systems.

Media access means that a computer's disk or tape hardware can read and write the physical data formats another computer uses. For example, the 3.5-inch floppy-disk drive in a Mac can read and write ProDOS and MS-DOS formats, but the standard 5.25-inch Apple II floppy-disk drive is physically incapable of reading or writing any of the MS-DOS formats used by IBM PCs and compatibles.

Data access means that a program running on one computer can read or write data in a format that's usable on another computer. For example, most word processors can read and write ASCII (plain text) files, regardless of whether they can read and write ASCII (plain text) files, regardless of the program or the type of computer on which they were created. In many cases, data transfer involves some loss of information. For example, Microsoft Excel, the leading Macintosh spreadsheet program, can't import an AppleWorks spreadsheet directly. But AppleWorks can save a spreadsheet in a format called *DIF* (*data-interchange format*), which Excel can use. The problem is that DIF files save only the values in spreadsheet cells, not the formulas that created those values.

Application access means that one computer can run programs that were written for the operating system of another computer. That usually requires special hardware, like a coprocessor card, or special software. Applied Engineering's **PC Transporter** card, which lets an Apple II run many MS-DOS programs, is an example.

THE MODEM SOLUTION

With modems and the right telecommunications software, you can exchange data between an Apple II and a Mac almost anywhere in the world, if both computers have access to a phone line.

The most direct method requires coordination

between sender and receiver. The receiving party sets his or her communication software to accept an incoming file. The sender makes sure the text file is saved on a disk the computer can access, and that both parties are using the same baud rate and the same file-transfer protocol, such as *XModem* or *Kermit*. *Protocols* are the rules that specify such things as the size of a chunk of data, or packet, how the beginning and end of a packet are indicated, and how the software will confirm that the data was received intact. The sender dials the receiver, and, when the connection is established, issues the appropriate "send file" command. The details vary according to your particular communications software. (See "Link Up With Telecommunications Software," May 1990, p. 50, for more information on individual programs.)

If both computers are in the same room, you can use a null-modem cable for a direct link between two communication programs, cutting the phone company out of the loop. For a GS connected to a Macintosh, the ImageWriter II cable will work.

One indirect method of modem communication (also called an *E-mail dead drop*) requires that both parties belong to the same on-line service, such as CompuServe, GEnie, MCI Mail, or America Online. You simply log on to your service and send your file as "electronic mail" to the user name of the intended recipient. The next time the recipient logs on, he or she will receive notice that incoming mail is waiting. The recipient can then download the file to disk and work with it "off line" (after hanging up). It's a convenient solution. The drawbacks are that the person with whom you want to communicate must belong to the same service you do, and that membership fees and connect-time charges can be steep.

In any case, putting your files into ASCII or DIF format for telecommunication strips out all the fancy fonts and formatting that make owning a Mac or a GS such a typographic delight.

TWO-STAGE TRANSFER

Oddly enough, using an IBM PC or compatible as an intermediary can be an effective way to transfer certain kinds of formatted files between an Apple II and a Mac — a number of excellent hardware/software products for Apple II-to-PC and PC-to-Mac file translation and conversion are available.

On the Apple II side, **Cross-Works** from SoftSpoken Company (reviewed in July 1989, p. 36) includes a multibranch cable that can connect any Apple II to any PC, plus software for both computers. Cross-Works converts AppleWorks word-processor, spreadsheet, or database files to a wide variety of formats compatible with standard MS-DOS applications. The actual conversion is always done on the PC, regardless of the direction of the transfer, to take advantage of greater speed and processing power.

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On the PC-to-Macintosh side, **LapLink Mac III** from Traveling Software is a similar combination product, with cables that allow high-speed data transfer, and format translators for most popular word processors.

Because many Macintosh applications can open and work directly with files created by their MS-DOS counterparts, converting an Apple II file to PC-compatible form may be all you need to do.

SOFTWARE SOLUTIONS

Hidden away in the Macintosh System Utilities (shipped with every Mac) is a remarkable application called **Apple File Exchange (AFE)**. Insert a ProDOS disk into the Mac drive, and AFE reads the directory and displays a scrollable list of files. Normally, only plain ASCII (text) and binary files are convertible. Select the files you want, click on the *Translate* button, and AFE writes the files as Mac text in a matter of a few seconds. AFE can translate in the other direction as well, converting Mac text files and writing them in ProDOS format.

If you're working with AppleWorks Classic files created with a version predating 3.0, the ASCII file you print to disk will contain extra carriage returns that mess up the appearance of your page. The Beagle Bros utility *AWP to TXT* included in **TimeOut PowerPack** takes care of that problem.

MacWrite II, published by Claris, includes an *XTND* (extended-command) file translator for word-processor files created in both AppleWorks Classic and AppleWorks GS. That means you can use Apple File Exchange to move a formatted AppleWorks document to the Mac (no ASCII step in between) and open it directly in MacWrite II, with all your tabs, underlines, and other settings preserved.

Claris has made its XTND technology available to other publishers, as well. For example, the Leonard Development Group's **SmartWorks** (reviewed in January 1991, p. 66) also reads AppleWorks files; the latest version of Timeworks' **Publish It! Easy** for the Mac, scheduled for a March release, reportedly will, as well. **Microsoft Works** (version 2.0 and later), one of the most popular integrated software packages for the Mac, can convert AppleWorks files to its own formats. If you have an AppleWorks spreadsheet, Microsoft Works can translate it and use it just as easily as a document created on the word processor. (See "Swap 'til You Drop," this month's Bridging the Gap column, p. 100, for more information on file-exchange solutions.)

IF YOU'RE MACLESS

Apple File Exchange is a great solution if you have a Macintosh handy, but what if you have an Apple II and a bunch of Mac-formatted disks with data you need to read? The GS/OS operating system is designed to accommodate *file system translators (FSTs)*, utilities that

can access "alien" file formats directly. The only one Apple has implemented, however, handles the High Sierra format used on CD-ROMs. The long-delayed translator for the Mac's hierarchical file system (HFS) is reportedly still under development.

While we're waiting for the official Apple solution, a useful little public-domain program fills the gap. It's called **A2FX**, by Chan Wilson. Only 23K in size, the program is written in assembly language. We saw a preliminary edition, but an enhanced version should be available early this year. A2FX is a simple menu-driven ProDOS 8 utility that can read data from Macintosh disks and transfer it to a ProDOS disk. It offers several options for dealing with the Mac's complex file structure, which divides a file into "data" and "resource" forks. For simple data transfers, the program works smoothly.

GS/OS introduced the Mac's bifurcated file structure (data and resource forks) to the Apple IIcs. **Resource Spy**, a program by Stephen Chick, converts certain Macintosh resources (icons and fonts) to useful Apple II formats. You'll need some degree of technical know-how to take advantage of this capability, though.

An unusual example of Mac-to-II transfer capability is provided by two file-compression utilities, **NuPack IIcs** by Joshua Thompson, and **ShrinkIt** for the GS by Andy Nicholas. These programs can extract .SIT-type files created by StuffIt, a standard Macintosh utility widely used to compress files uploaded to on-line services and bulletin boards. Basically, a file-compression algorithm looks for repeating patterns in the file's code. For instance, *BBBB* would become *4B*, which, while incomprehensible to anything but the original compression utility, cuts the required storage space and data-transmission time in half. Compression and decompression of bulletin-board files save time and money for both the person uploading and the person downloading the file. Use Apple File Exchange first to put .SIT files on a ProDOS disk before extracting them.

GET THE PICTURE?

Macintosh graphics images come in a bewildering variety of formats (PICT, MacPaint, TIFF, and encapsulated PostScript, to name a few), as do Apple II graphics (single hi-res, double hi-res, two kinds of super hi-res, Print Shop, and so on). **Graphic Exchange**, a utility program available from Roger Wagner Publishing, converts many Apple II graphics formats to MacPaint documents. (Color-palette information is lost, as MacPaint is limited to monochrome bit maps.) A remarkable GS program called **SuperConvert** translates MacPaint, Atari ST, Commodore 64, and other graphics formats to various Apple II (8-bit) and Iics formats. **Platinum Paint**, a new GS program from Beagle Bros (Editors' Choice, January 1991, p. 112), can import graphics in MacPaint format directly. □

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For object-oriented graphics (MacDraw or TopDraw) no II/Mac file-transfer solutions are yet available. On the Macintosh you can paste an object-oriented graphic (PICT format) into a document in MacPaint format, then convert it to an Apple II format, but that would leave you with just a bit map — no ability to select and edit individual objects.

For scanned or digitized graphics, the GIF (*graphic-interchange format*) standard lets Macs, PCs, and other systems exchange compacted picture files with color palettes, resolution, and proportions preserved relatively intact. To display GIF images on the Apple IIs you need the program SuperConvert; a similar program for the IIe/IIc is **IIGIF**. If the GIF file was created on a Macintosh, there's an additional step that requires a program called **GIFStripper**, owing to the nonstandard way the Macintosh adds file-header information to the basic binary GIF data. These shareware programs are available from many Apple II user groups and leading on-line services.

SHARING HARDWARE

Another aspect of Mac/Apple II connectivity you shouldn't overlook is the growing commonality of peripheral devices. Most 800K external floppy-disk drives for the Mac and the Apple II are compatible (except for the UniDisk).

The high-density (1.44-megabyte) floppy disk Apple introduced with the Mac IIx can read and write MS-DOS disk formats as well as ProDOS. For other Mac models, a company called the **Engineering Department**, founded by four of the original Apple II engineers, has produced a little module that plugs into the external floppy-disk-drive port of the Mac and tells the internal 3.5-inch drive how to read, write, and format 720K MS-DOS disks. At press time, an Apple II ProDOS-compatible version of this module was under development. Applied Engineering has also promised an eventual 1.44-megabyte upgrade for its new low-cost **800K 3.5-inch external floppy drive** for the Apple II.

The original Macintosh mouse also works on the Apple IIc. (On the IIe it needs an adapter card.) In addition, most devices that work with the Apple Desktop Bus (ADB) on the Mac SE and the Mac II — mice, keyboards, joysticks, and so on — will also work on the GS. Apple's ImageWriter II printer and the mighty LaserWriter work on either system with the same cable. The GS and the Apple IIc Plus also use Mac-style ("mini-8 DIN") serial-port connectors. What that means is that Apple II owners who decide to trade up to a Macintosh can often retain a large part of their hardware investment, or simply share peripherals.

With a SCSI adapter card, an Apple II can use Macintosh external hard drives. A few vendors even provide formatting software that can create ProDOS and Mac-

intosh "partitions" on a single hard drive, allowing two computers to share one drive — although not at the same time. (For more information on hardware solutions, see "Do You Need a Hard-Disk Drive?" March 1989, p. 47; "Which One to Buy?" April 1989, p. 47; "Do You Know Where Your Data Are?" May 1989, p. 54; "Bit by Bit," January 1990, p. 65; "The ADB Connection," February 1990, p. 51; "New SCSI Card," What's New, June 1990, p. 14; "A Hard Drive Is Good to Find," July 1990, p. 42; "Faster Than a Speeding . . .," Editors' Choice, November 1990, p. 96; "Shopping for a System," January 1991, p. 61; "The SCSI Side of Life," February 1991, p. 47; and "Off the Beaten Track," this issue, p. 88.)

TWO FOR ONE

Software-based emulation, such as the highly successful **SoftPC** from Insignia Solutions, which lets a Mac run many MS-DOS programs, requires a lot of memory and processing power. One Macintosh program, **II in a Mac** from Computer Applications, claims to emulate an Apple IIe on the Macintosh, running Apple II programs as well as converting files to Mac formats. (See "II Links to Mac," February 1986, p. 8, and "II on a Mac," News Line, February 1986, p. 15.)

Apple's long-awaited HyperCard IIs can, with the aid of HyperMover stacks, translate the command structure and convert and open HyperCard stacks developed on the Macintosh. That's probably as close as we'll ever get to "running Mac software" on an Apple II. Still, it's an impressive accomplishment. (See "HyperCard IIs: The Apple II Culture Reborn," February 1991, p. 37, for more information.)

Systems in which two different microprocessors coexist under the same roof have until now rarely been successful; the most notable exceptions were the variety of Z-80 cards that let the Apple II run CP/M software. In the II/Mac world, Cinech's proposed **Duet** card for the GS is a Mac coprocessor (see "Tech Notes," What's New, November 1990, p. 17), although at press time development of the card had been postponed indefinitely, owing to lack of marketing support for the GS, according to the company.

The new Mac LC's optional **II Emulation Card** runs 8-bit programs. It's a 65C02 microprocessor, with 128K of RAM and an integrated circuit for translating between the card and the Mac. The LC handles all input and output, except for a joystick/5.25-inch drive port, so theoretically you should be able to use all the printer, modem, ADB, video, and audio ports on the Mac. (See "Meet the Mac LC: What the Apple IIs Should Have Been?" in the December 1990 issue, p. 40.)

IN THE HOPPER

The Apple Programmers and Developers Association (APDA) offers a **Cross Development System** that lets

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programmers use the Macintosh to create programs in assembly language, C, or Pascal to run on the Apple IIs. It's a complex family of software products that run in the environment of the Mac Programmer's Workshop.

Developers would like to be able to pay the high cost of programming new applications just once, and then translate the code automatically into machine-specific versions. Functional differences between the microprocessors of Apple II family (6502, 65C02, and 65816) and those of the Macintosh family (68000, 68020, and 68030), as well as their very different operating-system conventions, make this a remote dream, however.

Consider the machines' Toolboxes, for example — sets of routines embedded in each computer's ROM that handle text editing, graphics, windows, and disk input/output. The GS Toolbox is similar in many ways to the Mac's, but it isn't identical, so code written for one system has to be edited extensively, modified, and debugged to ensure that it has all the proper Toolbox calls for the other system.

The number of programmers who know both systems well enough to do that is small, and the declining market share of the GS means that there's little incentive for new programmers to climb the steep GS learning curve.

Another obstacle is the hare-and-tortoise disparity in performance between the two systems. To run efficiently, a program's code has to be carefully optimized for a specific machine. The Apple II is an 8-bit or 16-bit system running at 1 or 2.8 megahertz, while the Macintosh is a 32-bit system with clock rates ranging from 8 to 40 megahertz. A program that runs fast on a Mac, for example, could be agonizingly slow on an Apple II. On the other hand, a game with reaction-time parameters that make it challenging on an Apple II would become an unplayable blur on the Macintosh, unless the conversion includes careful fine-tuning of event timing, delays, and other factors.

Let's hope that future versions of GS/OS and the Macintosh operating system will provide important areas of convergence, making it easier to port programs as well as files and data across the gulf separating the two systems. Until then, spread the word about file conversion and take a look at some of the current products that can help you take advantage of the best of both Apple worlds. □

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PRODUCT INFORMATION

Apple II Emulation Card.

\$199
HyperCard IIcs. \$99
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
(408) 974-1010

A2fx

Chen Wilson
3372 Middlefield Road
Palo Alto, CA 94306
(415) 858-2532
freeware

Cross Development System

APDA
Apple Computer, Inc.
20525 Mariani Ave.
MS/339
Cupertino, CA 95014
(800) 282-2732
\$190

Cross-Works

SoftSpoken
P.O. Box 97623
Raleigh, NC 27624
(919) 870-5684
\$99.95

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Campbell, CA 95008
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GIF Stripper

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Graphic Exchange

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El Cajon, CA 92020
(619) 442-0522
\$49.95

LapLink Mac II

Traveling Software
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Bothell, WA 98011
(800) 662-2852
\$168.95

MacWrite II

Claris Corp.
P.O. Box 58166
Santa Clara, CA 95052
(408) 727-8227
\$248

Microsoft Works

Microsoft Corp.
1 Microsoft Way
Redmond, WA 98052
(800) 426-8400
(206) 882-8080
\$295

NuPak ICS

Joshua Thompson
Frontier Technologies

P.O. Box 165
Grosse Ile, MI 48138
\$15 shareware

PC Transporter.

\$499
3.5-inch drive, \$279
Applied Engineering
P.O. Box 5100
Carrollton, TX 75011
(214) 241-6060

Platinum Paint.

\$99.95
TimeOut PowerPack.
\$49.95
Beagle Bros.
6216 Ferris Square
Suite 100
San Diego, CA 92121
(800) 892-4022

Publish It! Easy

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444 Lake Cook Rd.
Deerfield, IL 60015
(708) 949-9200
\$249.95

Resource Spy

Stephen Chick
2-1417 Port Village
Port Island, Kobe
Japan 850
\$15 shareware

ShrinkIt GS

Andy Nicholas
8415 Thornberry Drive East
Upper Marlboro, MD
20772
freeware

SmartWorks

Leonard Development Group
9143 Phillips Highway
Building 390
Jacksonville, FL 32256
(904) 464-0016
\$295
\$129 for educators
\$99 with AppleWorks
trade-in

SoftPC

Insignia Solutions
254 San Geronimo Way
Sunnyvale, CA 94086
(408) 522-7600
\$399

SuperConvert

Seven Hills Software
2310 Oxford Road
Tallahassee FL 32304
(800) 627-3836
\$39.95

It In a Mac

Computer Applications
12813 Lindley Drive
Raleigh, NC 27614
(919) 848-1411
\$69.95